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ample, as is given on page 3, of the chief works on the cleavage of mammalian eggs, should be highly appreciated by the general student.

There are in all six chapters, as follows: I., The First Cell Layers—(A) Of the Monodelphic and Didelphic Mammals; (B) Of the Ornithodelphic Mammals and Sauropsida, and (C) Of the Ichthyopsida. II., Farther Development of the two Germ-layers of the Vertebrata up to the Origin of the Somites. The Mammalia, the Amphibia, the Sauropsida and Ornithodelphia and the Fishes are treated. III., Diplotrophoblast-Serosa (Sub-zonal) Membrane, Chorion, Allantois and "Nabelblase" in Onto- and Phylogensis. IV., The part taken by the Trophoblast in the Nutrition and the Attachment of the Embryo. V., Various Points (Verschiedenes) on Placentation. VI., Considerations Touching the Phylogeny and the Systematic Divisions of the Vertebrata.

These contents of the chapters will suffice to show that as regards embryology proper only the very early stages are dealt with. Organogenesis does not fall within the scope of the work. The undertaking is such, too, that vertebrates other than mammals receive large attention. Of the 186 figures nearly one fourth are not mammalian, the larger number of these outsiders being of fishes, amphibians and reptiles.

As to exactly how much weight should be attached to Hubrecht's theory in its various ramifications (his trophoblast theory) only a student of the vertebrata can tell who is more experienced than he, and is far less of a special pleader. But any zoologist who is moderately well informed first hand in general vertebrate morphology and embryology, and who has likewise occupied himself in a serious way with problems of phylogeny, can readily see that the best that can be said for the most far-reaching contentions is that they may possibly be true. While it may be legitimate for a zoologist to find a measure of satisfaction in recognizing the various possibilities as to what the course, or rather courses, of vertebrate evolution may have been, it is well

never to lose sight of the fact that what is only possibly true is probably not true.

Hubrecht has pointed out facts enough to make it *possible* that his "vermactinial stage in vertebrate phylogensis," figured on page 22 and again on page 228, was a reality in some remotely past time. But dozens of other facts which he has not alluded to make it *probable*, to the reviewer's mind at least, that no such ancestral stage ever did exist.

Such a hypothetical creature would be harmless, indeed might have a certain usefulness, could it be presented merely as one among numerous possibilities, for if so presented it would not be chargeable, as it is almost sure to be when claiming exclusive rights, with distorting the facts upon which its existence depends; and it, along with its alternatives, might then help the mind to grasp the general truth that the actual animals dealt with have arisen by a natural, that is, an evolutionary process.

LA JOLLA, CAL.

WM. E. RITTER

THE SILKEN-HAIRED ONES

WHAT "Black Beauty" did for horses President Jordan's "Story of Matka"¹ ought to do for the unfriended fur-seals of the Bering Sea. The ruthless slaughter of these seals which will end, if not soon interrupted, in their certain extinction, is a hideous present-day world crime of which three great powers are openly guilty. In 1880 two and a half million fur-seals lived in Bering Sea. In this year 1910 of enlightened civilization, scientific knowledge and Christian sweetness and light there are still by good fortune alive 150,000 of these beautiful, silken-haired, soft-eyed creatures of nature's choicest making. The others have been slaughtered as mothers or starved as children by the refined methods of diplomacy cultivated by Great Britain, Japan and the United States.

Dr. Jordan wrote the "Story of Matka" on the very rocks where Matka lived, with Matka the mother seal and Kotik, the baby seal and Atagh, the grandfather and Eichkao, the blue

¹ "The Story of Matka," by David Starr Jordan. San Francisco, Whitaker-ay-Wiggin Co., 1910.

fox that "clin-n-g, clin-n-g-ed like a scared buzz-saw," and wise old Eparka, the sea-parrot, all under his keen eyes. He was there as the special correspondent of the great newspaper "Beneficent Science" which is published for the amusing, informing and guiding of all the men and women of the world. But the story moved no man nor woman; that is moved none to action. Or rather it did not move the needed many to compel the action that is necessary if the few Matkas and Kotiks that are left are not to be the last of their kind.

So now the story is reprinted in such form that it is to be offered to the children of the land to see if perhaps they may not feel more and do more than their fathers. It is a well-illustrated, simply told true tale, at once charming and pathetic, fascinating in its revelation of the wonderful ways of a child-bearing and child-teaching wild animal of the mist-wrapped islands of the north, appealing to every chord of sympathy and rousing to every instinct of antagonism for brutal cruelty.

V. L. K.

Laboratory Manual of First Year Science for Secondary Schools. By RUSSELL and KELLY. New York, Henry Holt & Co. 1909. Pp. 163.

This book gives the first printed account of the rather famous Springfield course in general science introduced five years ago by Dr. Thomas M. Balliet and Wm. Orr, then respectively superintendent and principal of high school, at Springfield, Mass.; now, respectively, dean of the school of pedagogy, New York University, and deputy commissioner of education of the state of Massachusetts. The authors have developed this course in great fidelity to the ideas and suggestions of their superior officers.

The purpose of the course is twofold: "(1) To give the pupil a broad general view of the whole field of science, (2) to explain to the pupil his every-day environment."

The work as it is conducted in Springfield is in a large measure informational, with abundant experimental illustration to make

the knowledge *real*. The lecture by the teacher, and the investigation by the pupils of matters to be found outside of the school, are the most effective features of the course.

The course is required of all first-year high-school students (those who have visited the school know that it would be easier to require than to prevent their taking it).

The course is flexible and changes from year to year and is, after all, a "*method of instruction*" rather than a "*course of study*." Such topics are treated as the following:

Reading of gas meters, water meters, electric meters, reading of water pressure and steam pressure gauges, water tests, charcoal filters, litmus tests, removal of stains, coal tar dyes, food tests, heating and ventilation, uses of the electric magnet, constellations, standard time, weather reports, candle power of light, cost of lights, germination of seeds, leaves, mould, building stones, ores.

JOHN F. WOODHULL

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SPECIAL ARTICLES

PULSATIONS IN SCYPHOMEDUSÆ DEPRIVED OF THEIR MARGINAL ORGANS

WHILE working at the Harpswell Laboratory, I found that the two Scyphozoa so common on the coast of Maine, *Aurelia flavidula* and *Cyanea arctica*, responded differently to operations on the marginal organs. The European species of these two genera have been studied by Eimer and Romanes, with respect to this point and these two men were unable to agree as to the behavior of the animals with excised marginal organs. Mayer has stated that *Aurelia* (he does not specify the species) is temporarily paralyzed when the marginal organs are excised and this agrees with my observations. Eimer, too, reached a similar conclusion, but Romanes's experiments led him to state that, while many specimens did regain their pulsations, although always irregular and obviously different from those of a normal specimen, yet the greater majority remained quiescent.

Romanes failed to be as explicit in his statements concerning the behavior of these